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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,348	10/20/2003	Stephan Grunow	TI-36564	4206

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EXAMINER	
FARAHANI, DANA	

ART UNIT	PAPER NUMBER
2891	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

EJ

Office Action Summary	Application No.	Applicant(s)	
	10/689,348	GRUNOW ET AL.	
	Examiner	Art Unit	
	Dana Farahani	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 3, and 5-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA), previously cited, in view of Chan et al., hereinafter Chan (US Patent 6,410,985), also previously cited.

Regarding claim 1, AAPA discloses in figure 1, a low K dielectric with an upper surface formed over a semiconductor; a first trench, 45 at the left side, formed in the dielectric layer wherein the trench has sidewalls; a first contiguous barrier layer 30 formed to a thickness X1 over the upper surface of the dielectric layer and formed to a thickness X2 on the trench sidewalls.

AAPA does not disclose that X1 is greater than X2.

Chan discloses in figures 2A-2G, a trench, wherein a barrier layer 202 on the sidewalls have a thickness X2 and at the upper surface of the trench the layer has a thickness of X1, wherein X1 is greater than X2 (see column 5, lines 54-63), although is apparent from the figure that the ration is greater than 3 to 2, Chan does not expressly state the ratio. It would have been obvious to one of ordinary skill in the art at the time of the invention to make the X1 greater than X2 in the structure of AAPA, since thicker layers are undesirable as unnecessarily filling a portion of the limited width of the groove (see Chan, column 6, lines 1-3).

Regarding claim 3, AAPA discloses a second trench, at the right side of the first trench, is formed in the dielectric layer.

Regarding claims 5, 7, and 11, AAPA in view of Chan renders obvious the claimed invention, as discussed above, except for expressly stating the ratio X1 to X2 is greater than 3 to 2, although it is apparent from the figure that the ratio is in fact greater than 3 to 2. However, It would have been obvious to one of ordinary skill in the art at the time of the invention to determine the ratio of the distances X1 to X2 in accordance with the particular application in which the interconnect structure would be used. See *In re Boesch,* 617 F. 2d 272, 205 USPQ 215 (CCPA 1980) for the proposition that discovering an optimum value of a result effective variable involves routine skill in the art.

Regarding claims 6, 9, 13, and 16, Chan discloses a second barrier layer 204 over the first contiguous barrier layer.

Regarding claims 10, 14, and 15, AAPA in view of Chan renders obvious the claimed invention, as discussed above, except for expressly disclosing the dielectric layer having a dielectric constant less than or equal 3.7. It would have been obvious to one of ordinary skill in the art at the time of the invention to determine the kind of material that would be suitable as the dielectric layer in accordance with the availability and cost of the material, and one of ordinary skill in the art preference of how much the parasitic capacitance should be reduced for a particular application. See *In re Leshin*, 125 USPQ 416, for the proposition that it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

Regarding claims 2, 8, and 12, AAPA in view of Chan renders obvious the claimed invention, except for the plurality of trenches are separated from each other by a distance of less than 160 nm. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the distance between the trenches less than a particular value in accordance to the size of the device which implements the interconnect structure. See *In re Boesch,* 617 F. 2d 272, 205 USPQ 215 (CCPA 1980) for the proposition that discovering an optimum value of a result effective variable involves routine skill in the.

Response to Arguments

3. Applicants' arguments filed 11/15/05 have been fully considered but they are not persuasive.

Regarding applicants' argument that the ratio between X1 and X2, as was the case in *In re Boesch,* is not a result-effective variable, as stated above, the Chan reference in the figures discloses this limitation, although it does not expressly state it, as explained above. Assuming, *arguendo*, that the reference does not implicitly teach the ratio, it is still recognized by the courts that dimensions recited in a claim, is obvious to choose, to one of ordinary skill in the art, when the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In response to applicants' argument that the advantage recognized by applicants is not found in any of the cited prior art, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571)272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani

B. WILLIAM BAUMEISTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800